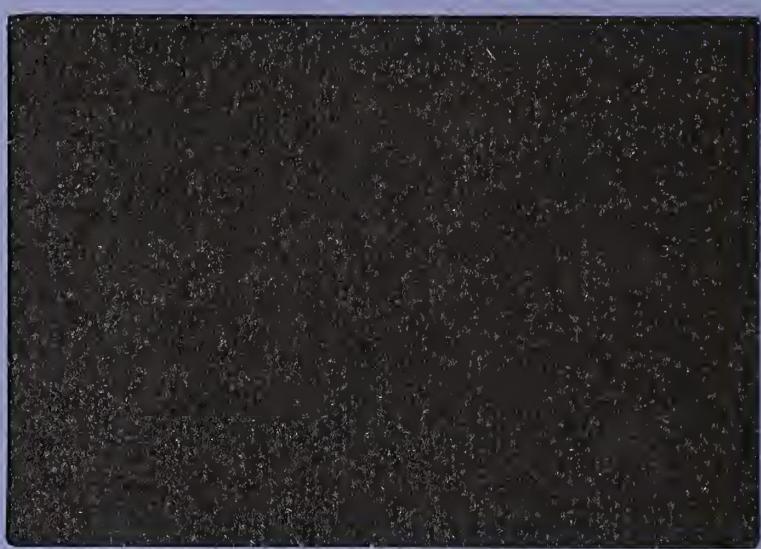




TO SIGN OR NOT TO SIGN:
PHYSICIAN PARTICIPATION IN MEDICARE, 1984

Final Report

CENTER FOR HEALTH ECONOMICS RESEARCH





**CENTER FOR HEALTH
ECONOMICS RESEARCH**

Hillsite Office Building
75 Second Avenue, Suite 100
Needham, MA 02194
(617) 444-8910

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Final Report

by:

Janet B. Mitchell, Ph.D., Project Director
Margo L. Rosenbach, Ph.D.
Jerry Cromwell, Ph.D.

April 1987

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1.0 INTRODUCTION AND EXECUTIVE SUMMARY1.1 Statement of the Problem

Continued double-digit inflation in Part B Medicare expenditures led Congress to revise the Medicare physician payment system. The Deficit Reduction Act (Public Law 98-369), enacted in July 1984, imposed a 15-month fee freeze on Medicare services and altered the terms of physician participation in Medicare.

Prior to the enactment of the Deficit Reduction Act (DEFRA), Medicare allowed physicians flexibility in how they billed and collected for Medicare-covered services, permitting them to accept assignment on a service-by-service basis. Physicians could refuse assignment and bill patients for amounts in excess of the customary, prevailing, and reasonable (CPR) charge. This system increased beneficiary outlays, while giving them greater access to "higher priced" physicians.

Under DEFRA, Congress restrained the physicians' assignment options by giving them the opportunity to sign a participation agreement on a renewable (year-to-year) basis, beginning in October 1984. This agreement committed participants to accept all Medicare patients and services on assignment. No balance billing of Medicare beneficiaries was permitted. The physician could bill the patient only for the deductible and 20 percent coinsurance. Physicians who did not sign the participation agreement could accept assignment on some, none, or all Medicare services, and they could bill patients for nonassigned amounts in excess of the Medicare allowed charge.

The fee freeze introduced under DEFRA was intended to differentially affect physicians according to their participation status. For both participants and non-participants, Medicare customary and prevailing charges were frozen for a 15-month period from July 1, 1984 to September 30, 1985 at the levels that were in effect for the 12-month period ending June 30, 1984, per instructions to carriers. Actual charges (those submitted or billed by physicians, as opposed to the approved or reasonable charges Medicare will pay) were frozen for those physicians who did not sign the participation agreement.

Participating physicians were allowed to increase their actual charges during the freeze period. Because payments were based on allowed charges which were frozen, higher actual charges did not result in higher immediate Medicare payments. These higher actual charges, however, were taken into account when the charge profiles for participating physicians were updated at the end of the fee freeze. This was one of the inducements for physicians to sign the agreement, as non-participants did not receive updates based on higher actual charges. Moreover, increases in actual charges of non-participating physicians in the interim could result in civil money penalties and/or exclusion from the Medicare program for up to five years.

Additional incentives were offered to physicians, including the publication by carriers of directories of participating physicians; dissemination of names of participating physicians by toll-free telephone lines; enhanced carrier capacity to receive claims electronically submitted; and decals and certificates for physicians to use in their offices indicating their participation status.

Carrier data produced by HCFA's Bureau of Program Operations showed that 30 percent of physicians treating Medicare patients signed a Physician Participation Agreement (PPA) as of October 1, 1984. These carrier data can be used to derive participation rates by specialty, state, and Medicare volume. While extremely valuable in determining the success of the Medicare PPA program in a broad sense, the carrier reports are silent on the physician, practice, and local economic characteristics of participants versus non-participants. This report draws upon a unique data base, a national survey of physicians, to analyze the factors influencing the participation decision.

Since the fall of 1984, the Medicare Participating Physician Program has been modified, new incentives have been added, and physicians have had additional opportunities to sign (or not sign) the Agreement. In this report, we focus strictly on the original 1984 participation decision. In later work, with new survey data, we will be able to analyze subsequent decision points in 1985 and 1986.

1.2 Summary of Findings

Our analysis of the 1984 participation decision was based on a national survey of patient care physicians conducted between October 1984 and June 1985. A total of 2,184 self-employed physicians were included, representing all specialties except anesthesiology, pathology, pediatrics, psychiatry, and radiology. About one-third (33.7%) responded that they had signed the Medicare participation agreement in September 1984. Participation rates ranged from a low of 24 percent for family practitioners to a high of 50 percent for "all other" specialists (primarily emergency room physicians and neurologists).

Multivariate probit analysis was used to assess the factors leading physicians to sign the participation agreement. The participation decision was found to be highly sensitive to Medicare reimbursement levels. Physicians were significantly more likely to sign participation agreements when Medicare paid more. A 10 percent increase in the Medicare reasonable charge increased average participation rates by 9.7 percent, or 3.3 percentage points (around the mean of 34%). Higher collection costs associated with obtaining that payment from Medicare, on the other hand, discouraged participation. Physicians were significantly less likely to sign when the carrier investigated claims more frequently or when the carrier was more likely to deny them outright.

Medicare dependence also had a strong impact on the participation decision. Physicians who had large Medicare caseloads to start with were significantly more likely to sign participation agreements.

Despite suggestions that the quality of medical care provided by participating physicians may be inferior (see, for example, Cotter and Willer, 1985), we found no evidence that board-certified physicians were any less likely to participate. Graduates from non-English speaking, non-Western European medical schools were significantly more likely to sign agreements, however. There were few specialty differences in participation rates, although general surgeons, OB-GYNs, and "all other" specialists did sign up in disproportionate numbers, compared with other physicians.

Increased competition, as measured by more physicians per capita, had no impact on the participation decision, suggesting that physicians may be able to protect their private and nonassigned workloads through inducement.



This ability was constrained, however, in areas with greater HMO activity, and here physicians were significantly more likely to participate. Other factors encouraging participation included:

- lower malpractice costs;
- more difficulty collecting from patients; and
- weaker private demand, as measured by lower per capita area incomes.

Finally, physicians practicing in the South and in the West were significantly less likely to participate than were physicians in the Northeast and North Central regions of the country. These inter-regional differences may partially reflect differences in physician attitudes.

These results should be interpreted with some caution. This initial participation decision was made under great time pressure and under conditions of great uncertainty. DEFRA was passed in late July 1984, and participation decisions had to be made by September 30. Many physicians, especially those returning after Labor Day from summer vacations, had little time to learn how the program was supposed to work. Some physicians may not have been adequately informed about the advantages and disadvantages of participation; others may have been misinformed. Some physicians, while understanding the incentives, may have discounted their real value (particularly the customary charge update for participants post-freeze), and chosen not to participate. At subsequent decision points, physicians may be better informed and make more rational choices. As a result, we might expect to observe even larger impacts of policy variables, such as Medicare reimbursement levels.

1.3 Overview of Report

Chapter 2 lays out a detailed description of the theoretical framework used to model the physician's participation decision. Our unique data base is described in Chapter 3. Chapter 4 presents some descriptive comparisons of participants and non-participants. Finally, we use multivariate probit techniques to estimate the probability of participation (Chapter 5).

2.0 ANALYTIC FRAMEWORK FOR PHYSICIAN MEDICARE PARTICIPATION

In earlier studies, we have analyzed both the physician's decision to accept assignment (Mitchell and Cromwell, 1982) and to participate under an all-or-nothing assignment requirement (Mitchell and Cromwell, 1983). The theory developed in these papers can also be applied to the new Participation Agreement offered by Medicare in the Fall of 1984, with some modifications. We begin by laying out the general theoretical construct explaining physician participation (relying heavily on our two previously published papers, plus Sloan, Cromwell and Mitchell (1978) and Paringer (1980)), then discuss the "carrot-and-stick" incentives in the Agreement.*

2.1 Previous Theory of the Elderly Market for Physician Services

The physician is regarded as facing demand schedules in two markets. In the fee-setting market, the physician establishes the price of his services and patients pay either out of pocket or through private insurance. In the price-taking market, the physician accepts the third-party payer's fee schedule as payment-in-full. The physician is a price-taker when he accepts assignment under Medicare. Even under assignment, the physician may (must?) bill the patient for amounts corresponding to the deductible as well as the fraction (20%) of the prevailing charge not paid for by Medicare. Because of these cost-sharing features, changes in the maximum allowed payment under Medicare will have demand as well as supply effects. Historically, the physician could choose on a case-by-case basis whether or not to accept assignment. He could elect to take only a portion of his Medicare patients on assignment and charge the others his usual fee, or he could even refuse assignment for one claim and accept the next claim for the same patient. Such flexibility in billing greatly complicates the analysis.

*In subsequent agreement decisions (1985 and 1986), the incentives to participate have been modified. Our discussion in this report is limited to the incentives inherent in the original 1984 agreement. In later work, when we analyze physicians' 1985 and 1986 decisions, we will extend the theory.

Let us consider for the moment solely the demand Y_M for physician services by the elderly, without insurance (see Fig. 2-1). Demand is downward-sloping, and additional visits are demanded only at a lower price. At zero price, the elderly would demand a maximum of V_m physician services. Assuming no price discrimination and revenue maximization for each visit level, the physician will move down along his marginal revenue curve (Y_X), until unit marginal revenue equals marginal costs.

Let us now introduce a health insurance program like Medicare. Assume that, for a given physician a maximum allowed payment under Medicare is set at R , with a coinsurance rate, γ , equal to 20 percent. In order to simplify the graphical analysis, we also assume that the deductible has already been satisfied. The patient is responsible for paying γR out-of-pocket, while Medicare will pay the remainder of the allowed charge, $(1-\gamma)R$. This shifts demand upward by an amount equivalent to $(1-\gamma)R$, and results in a new demand curve, $ACDM$, and a new marginal revenue curve, AX' . The insured demand curve is kinked at D because visits beyond V_m would imply negative out-of-pocket expenditures.

We will assume for now that the physician incurs no collection costs for either his assigned or his non-assigned patients. In the non-assigned market, demand is downward-sloping as before, while in the market for assigned Medicare services, the physician can supply as much as he chooses for a fixed price (subject to demand constraints discussed below). In maximizing revenue, the physician will move down along his new marginal revenue curve AB , until marginal revenue falls below the Medicare allowed charge R , or point B . After B , it becomes financially advantageous to accept the marginal patient on assignment, because he can receive a constant R from these patients without having to lower his fee for all his non-assigned patients. The assignment decision will also be influenced by whether the Medicare patient is Medicaid-eligible as well; the physician must accept this patient on assignment or forego any Medicaid reimbursement for him. The pool of joint Medicare-Medicaid patients will lengthen the horizontal curve BC (see fig. 2-1), as marginal revenue equals R for all patients beyond point C . The Medicare carrier pays $(1-\gamma)R$, while the state Medicaid program is responsible for γR .

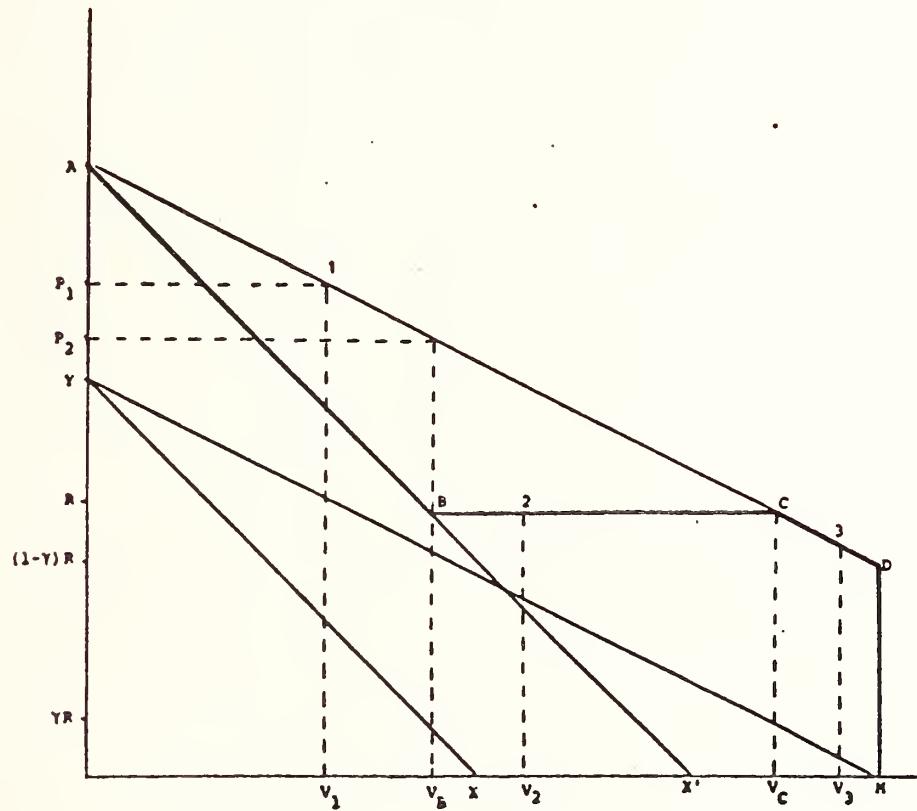


FIGURE 2-1 THE ELDERLY MARKET FOR MEDICARE SERVICES

When the physician begins taking patients on assignment, he enjoys a constant marginal revenue equal to R for each visit supplied. Along the horizontal curve BC , the physician receives $(1-\gamma)R$ from Medicare and γR from the patient. Because of the coinsurance, however, the marginal revenue curve kinks at C , and marginal revenue is again downward-sloping, as patients are no longer willing to pay the full coinsurance. As shown on the original demand curve YM , patients will demand only V_c services at a net price of γR . Along CD , the physician receives $(1-\gamma)R$ plus whatever fraction of the coinsurance his patients are willing to pay him. Consequently, unlike the usual textbook case where the truncated marginal revenue curve would be below the demand curve, the two curves coincide along CD , assuming that the physician price discriminates among these patients *ex post*. Because of the UCR procedures used to set Medicare fees, the physician must bill his full allowed charge, R , to all assigned patients. This way he ensures that he receives at least $(1-\gamma)R$ from the carrier, but we assume that he leaves it up to the patients to pay the remainder rather than lower his fee on all of these very poor eligibles. Eventually, patient demand is exhausted (i.e., the out-of-pocket price falls to zero), limiting the extent of the assigned market to $V_m - V_b$.

Whether the physician enters the assignment market, and the amount of visits he supplies there, will depend on the intersection of his marginal revenue and marginal cost curves. Consider three physicians whose MR and MC curves intersect at points 1, 2 and 3. The physician at point 1 will supply V_1 non-assigned visits at price P_1 and will not enter the assignment market. At point 2, the physician will allocate V_b visits to non-assigned patients at P_2 and $V_2 - V_b$ on assignment. In the assignment market, physician 2 receives the constant Medicare payment R , as all of assigned patients are willing to pay the full coinsurance. The physician at point 3 also provides V_b visits to non-assigned patients, but participates more extensively in the assignment market, supplying $V_3 - V_b$ visits. For $V_3 - V_c$ assigned visits, however, patients are not willing to pay the full coinsurance and the physician's marginal revenue falls below R .

We have used this model in our earlier work to analyze the potential impact of three important considerations: (1) a change in Medicare allowable fees; (2) variations in patient and Medicare collection costs; and (3) the all-or-nothing decision.



Changes in Allowable Fees

As an introduction to fee freezes, imagine what impact a lower Medicare allowable should have on assignment rates. The answer is in the expected direction but not nearly as strong as might be expected. A decrease in the allowable, R , shifts down the horizontal portion of the marginal revenue curve, BC , which would discourage assignment. That is, the kink at B moves down along AB as the physician now takes fewer patients on assignment. Interestingly, though, the marginal revenue curve itself is moving downward with lower allowables because the non-assigned patient can now collect less from Medicare. The physician eventually recognizes that lower allowable is depressing non-assigned Medicare demand as well, thus offsetting the direct effect of taking fewer beneficiaries on assignment. Nevertheless, we have shown that the net effect is still towards less assignment, with point B moving rightwards.

Collection Costs

Positive collection costs unambiguously lead to earlier, more extensive Medicare assignment, as the physician's demand and marginal revenue curves rotate inward. How much so depends on the physician's gross fee and his private collection cost vs. the Medicare collection cost. Physicians in poorer areas should have higher private collection costs, ceteris paribus, encouraging assignment. Medicare collection costs can be modelled as a downward shift in the horizontal portion of their demand curve, discouraging assignment. Because Medicare collection costs can be as much perceived as real, many physicians will overstate such costs, choosing non-optimal (i.e., lower) assignment rates.

All-or-Nothing Decision

Our earlier "all-or-nothing" analysis dealt with a somewhat different decision choice than that eventually presented physicians in the Fall of 1984, but it is instructive nonetheless. The 1976 Physician Practice Costs Survey included the hypothetical question:

If you had to make a choice between accepting all of your Medicare patients on assignment, or none..., which would you choose?

Theoretically, we argued that the physician's response depended on the relative net losses from either choice. (The physician likely loses either way because of restricted flexibility in choice of payer, the patient or Medicare). According to a simple model, the physician should choose the "none" option most of the time. Only when the physician begins seeing Medicare patients too poor to pay even the coinsurance does he seriously consider the "all" option (Mitchell and Cromwell, 1983, p. 61).

The decision will depend on his price elasticity of demand and the size of his assigned caseload. The more price inelastic his demand, the more he will have to lower prices to maintain his caseload under the "none" option. The larger his previously assigned caseload, the more he must lower his fee for all patients to keep his caseload stable under the "none" option.* Higher private collection costs for some beneficiaries have undoubtedly led to higher assignment rates in the past, hence making some physicians more likely to accept the "all" option in the end. Strong empirical confirmation for previous assignment levels and collection costs was found in our earlier work. While physicians were given a basically different alternative under Medicare's Participation Agreement, the percent accepting the "all" option was remarkably similar (31-33%) in spite of a nine year hiatus.

2.2 Medicare's Participation Agreement

The choice eventually made by physicians in the Fall of 1984 was somewhat different than our hypothetical one above. First, if they chose not to sign the Agreement, they could still take 1%, 50%, or even 100% of their patients on assignment. That is, non-participants could still price discriminate and enjoy the Medicare allowable when it exceeded what the patient could be expected to pay. Second, the "stick" of not signing was a

*These predictions do not allow for price discrimination among patients. If the physician can charge each patient exactly what he/she is willing to pay, then fees do not have to fall on wealthier patients in order to retain poorer patients.

longer period over which their allowables would be frozen, or not updated, than those who signed. And third, "carrots" to signing included (a) being put on a list of participating physicians and (b) enjoying more rapid bill processing.

The unwillingness of Congress to "lock-out" non-participants from receiving direct government payment theoretically attenuated the sign-up rate. This is because non-participants did not have to lower their fees in order to maintain all of their previously assigned patients; they could simply continue to bill Medicare as before when it suited them.

The primary carrot to participating was the lifting of the fee freeze 15 months later. Non-participants would continue to have their allowables frozen which theoretically has two effects. The direct effect is a constant horizontal portion of their assigned demand curve, resulting in less real, inflation-adjusted, income on their assigned patients in the future. The indirect effect comes from an unchanging demand curve for unassigned patients (ignoring income growth and greater medical need for the moment), cutting back the advantages to simply reducing assignment rates and balance billing. In other words, unassigned Medicare patients of non-participating physicians will be less well insured 15 months hence because they can collect less from Medicare in real terms.

How important the carrot of updated fees would be to physicians depends on (a) their overall Medicare caseload, (b) their inflation in practice costs, and (c) the growth in physician supply. Physicians with trivial Medicare caseloads will lose less by having their allowables frozen and can shift out of Medicare most easily. Rapid inflation in costs would make the freeze more onerous, thereby encouraging physicians to sign. Ironically, the current Administration's success in controlling inflation has probably encouraged physicians not to sign the Agreement--at least to some degree. Finally, the rapid proliferation of physicians has encouraged competition, which has the effect of shifting demand inward as more physicians carve up a relatively constant Medicare caseload. This (a) limits their ability to shift out of Medicare to more lucrative private patients, (b) raises the chances of non-assigned patients switching to new physicians, and (c) restricts their effective ability to balance bill if they do not take assignment.

2.3 Interaction of the Fee Freeze and Participation Agreement

It is important to keep in mind that the decision to sign the Agreement and a particular physician's response to the freeze are not independent. Each physician will sign or not with a Medicare "strategy" in mind. This could include doing nothing different, or making some more or less subtle changes in volume and billing practices, or working more or less. Behavioral responses should be least among the 0% and 100% assignment physicians. Thus, it is the "swing" group with an assignment mix that is of particular interest. Those signing the Agreement recognize they will lose some income by foregoing balance billing, and consequently are less likely to be sensitive to this loss than those not signing. In other words, if Medicare had made assignment mandatory, more volume responses would have been predicted as fewer participants would have been satisfied with their Medicare fees. The voluntary nature of the Agreement greatly reduces expected volume effects although not eliminating them entirely.

Why would less-than-100% assignment physicians ever sign the agreement? First, they simply may be income targeters and are willing to provide more services at a lower marginal revenue in order to preserve their absolute incomes. Second, if they retain some "unused" discretion to induce demand at the low (falling) end of assigned demand (CD in fig. 2-1), they will not have to reduce actual transactions' fees as much as if demand were unchanged. Thus, some physicians may choose to sign the Agreement, irrespective of the carrots-and-sticks, with the knowledge that they can marginally expand their revenue. Were their demand falling rapidly, say, due to heightened competition, then they would be more likely to sign in order to protect their caseloads from more patient switching.

2.4 Inflationary Effects

In first deciding to sign the Agreement, all physicians faced dynamic uncertainty as to the rate at which frozen allowables would be eroded in real terms. The low inflation rate in the last two years certainly should have led physicians to discount the advantages to updated fees after the freeze, discouraging them from participating. This tendency to discount the updating would be reinforced if physicians were uncertain about the length and scope of

the freeze. The Administration, indeed, did extend the freeze on participants as well as non-participants, essentially vindicating those who doubted the government's promise to update.

2.5 Patient Switching and Competition

Considerable uncertainty also faced physicians on the degree of patient switching between those who did and did not sign the Agreement. While patient switching in response to promulgation of participating physician lists should be minimal over 1-2 years, physicians were estimating patient responses in a period of growing competition and declining caseloads. For this reason it is natural for many to overemphasize the switching potential (including the sign-up of newly eligible beneficiaries).

Competition among physicians is increasing rapidly over time for two reasons: (1) net additions to the physician stock are exceeding population growth by a considerable amount; and (2) HMOs, PPOs, and IPAs are applying stricter utilization controls, either directly on their own physicians or indirectly on fee-for-service physicians trying to maintain caseloads in a period of slow or declining utilization. Both forces result in less demand per physician over time, offset to some unknown degree by broader physician coverage and an aging population.

Competitive effects on Medicare-specific demand are ambiguous. Without the potential of shifting, whether physicians will exhibit more or less Medicare activity will depend on what happens to private demand. (It will also depend on the physician's supply curve.) If greater physician supply in an area shifts demand per physician uniformly inward, then entire practice demand per physician declines and the ability to shift out of Medicare under frozen fees is attenuated but still positive. If competitive effects are asymmetric, working more on non-Medicare patients, then Medicare volumes could remain constant or even rise under the freeze!

Heightened competition naturally encourages inducement among income targeters because of accelerated revenue loss. Physicians engaging in such activity, however, increasingly risk significant patient loss to HMOs and PPOs. Hence, an important theoretical distinction is made between competition fostered by greater physician stocks vs. that resulting from HMO-PPO penetration. Ceteris paribus, inducement and volume growth is more likely in

areas with very limited HMO-PPO activity. These are generally rural areas. Young physicians are far more inclined to locate in rural areas, however, adding significantly to local supply and making them prime geographical candidates in which to observe accelerated volume growth via unhampered inducement.

Competition should also raise the probability of signing the Participation Agreement, although we did not find empirical support for this in our 1976 all-or-nothing work (Mitchell and Cromwell, 1983)--possibly because competition was much less eight years ago. Presumably, fear of patient switching would be greater in areas where patient choice was more extensive, ceteris paribus. The simple correlation between physicians per capita and assignment rates (a proxy for participation) is not that high, however, due to confounding factors, e.g., maldistribution of physicians within states, insurance coverage, age distribution of population.

2.6 Price Discrimination

Physicians often complain that they must balance bill, or forego assignment, in order to make up for patient loss via competition. (They also argue for balance billing due to higher practice costs.) This seems counter-theoretical, implying that they can charge more than they have in the past. To the extent that perfect price discrimination (charging each patient what he/she is willing to pay) has psychic and real collection costs, it is likely that physicians do take some patients on assignment that they could collect more from on an unassigned basis. Faced with some immediate revenue loss by signing the Agreement, some physicians will not sign, realizing they have not price discriminated as much as they could have. They are encouraged to push further now if they lose patients to participants or their frozen fees are eroded by inflation (see Mitchell and Cromwell, 1982, p. 252.)

Whether this appears as demand shifting is uncertain. Legally, the non-participating physician cannot raise his fees to unassigned patients, but he can price discriminate some more in the way he treats collections. Price discrimination is accomplished both explicitly by stating higher (lower) fees to wealthier (poorer) patients as well as implicitly by stating a uniform fee to all patients then collecting different amounts ex post. The latter, we

believe, is quite prevalent because stated fees are used by Blue Shield and Medicare to determine future allowables; discounting fees on the bill only works to lower potential payments from insurers. Recovering a greater percentage of his stated fee from the unassigned or assigned patient would be a perfectly legal response not reflected in either greater volumes or excessive fees.

3.0 METHODS3.1 Data Sources

The primary data source for this analysis is the 1984-85 Physicians' Practice Costs and Income Survey (PPCIS) conducted by the National Opinion Research Center (NORC) for the Health Care Financing Administration (HCFA). The survey was a nationally representative sample of non-federal, patient care physicians. An extensive questionnaire was administered to all physicians by phone. This questionnaire included data on practice costs, work effort, patient mix and type of practice, physician income, and fees. All information was based on physician self-reports.

The sampling frame for the PPCIS was the list of 331,264 active, patient care physicians contained in the 1984 Physician Masterfile and maintained by the American Medical Association. NORC used a single-stage stratified element level, random sampling design based on 136 discrete strata that were defined in three basic dimensions: specialty group, geographic region, and degree of urbanization. The overall participation rate was 68 percent; statistical weights used in the analysis included adjustments for nonresponse as well as for the disproportionate probability of selection. The data presented have been weighted to provide national estimates. As the degrees of freedom for significance testing would be inflated, the weights have been normalized.

A number of additional data sources were merged with the physician surveys for these analyses. Biographic information on individual survey physicians was obtained from the 1984 AMA Masterfile, including such data as physician age, board-certification, and medical school. Variables describing the physician's county, such as demographic characteristics, were drawn from the Area Resource File.

Missing values were replaced using several techniques. For example, Medicare dependence was replaced with the specialty-specific mean. As another example, malpractice premiums were imputed based on a regression equation including practice size, specialty, region of the country, and percent of workload surgery.

3.2 Sample Description

A total of 4,729 physicians were included in the PPCIS sample. Only self-employed physicians who treated Medicare patients were asked whether they had signed the participation agreement, leaving a sample of 2,878 physicians (1,476 were employed by a hospital, clinic, or HMO, and an additional 375 self-employed physicians stated that none of their patients had Medicare Part B as a primary payer).

For purposes of this report, we further excluded 694 physicians. This included all psychiatrists, anesthesiologists, pathologists, and radiologists. The practice patterns of these specialties are so different from those of other patient care physicians that we felt they should not be included in the same analysis; in particular, a key policy variable (the Medicare reasonable charge for an office visit) was inappropriate for these specialties. In later work, we plan to analyze these four specialties separately, using specialty-specific fee variables for them. Finally, we also excluded pediatricians; the number treating Medicare patients was so small (n=29) as to preclude any meaningful analysis for this specialty.

The final sample size for the participation analysis was 2,184 physicians. Table 3-1 displays the (unweighted) sample sizes for each specialty group.

The wording of the question related to the signing of the Medicare Physician Participation Agreement was as follows:

Congress has recently enacted new legislation concerning Medicare patients and assignment of benefits. Physicians have been given an opportunity to sign an agreement to accept assignment of benefits for all their Medicare patients.

Q72. Have you signed a Medicare participation agreement to accept all of your Medicare patients on assignment?

Yes. (ASK A) 1
No (ASK B) 2

A. If yes, what was the main reason you signed the agreement?

B. If no, what was the main reason you did not sign the agreement?

Questions 72A and 72B elicited verbatim responses on the physicians' reasons for signing or not signing the Medicare PPA. These responses have been analyzed in detail in an earlier report (see Rosenbach, Hurdle, Cromwell, 1985).

TABLE 3-1

SAMPLE SIZES BY SPECIALTY

Specialty	Sample Size
General Practice	182
Family Practice	338
Cardiology	110
Internal Medicine	340
Other Medical Specialties ^a	190
General Surgery	202
OB-GYN	192
Ophthalmology	126
Orthopedic Surgery	127
Urology	141
Other Surgical Specialties	144
All Other Specialties ^b	92
<u>Total</u>	2,184

^aExcluding pediatrics.^bExcluding anesthesiology, pathology, psychiatry, and radiology.

Source: Physicians' Practice Costs and Income Survey, 1984-85.



4.0 DESCRIPTIVE ANALYSIS OF PARTICIPANTS AND NONPARTICIPANTS

In this chapter, we present descriptive comparisons of participants and nonparticipants. These results will differ somewhat from those shown in our earlier report (see Rosenbach, Cromwell, Hurdle, 1985) because we exclude some specialties here. As described in Chapter 3, we excluded anesthesiologists, pathologists, pediatricians, psychiatrists, and radiologists from the following analyses.

4.1 Specialty

One-third (33.7%) of self-employed physicians with any Medicare patients signed the Medicare Participation Agreement as of October 1984 (Table 4-1). The survey estimate is slightly higher than the estimate obtained from HCFA carrier data (29.8%). The differences between these two estimates may be a function of limitations in the scope of the survey estimate, for example exclusion of osteopathic physicians, limited license practitioners, physicians practicing less than 20 hours per week, and physicians employed by hospitals or other settings (Rosenbach, Cromwell, Hurdle, 1985).

General surgeons have historically shown high assignment rates (Mitchell and Cromwell, 1981) and their high participation rates (46.5%) are consistent with expectations. For the remaining surgical specialties shown in Table 4-1, most of the participation rates clustered around the specialty-wide mean (32-34%), although ophthalmologists and "other surgical" specialists appeared to be somewhat below this average, at 29 percent and 26 percent, respectively. (Other surgical specialties include plastic surgery, cardiovascular/thoracic surgery, otolaryngology, and neurosurgery.)

While the participation rate of internists averaged 1-in-3, we see that medical subspecialists were slightly more likely to sign the Agreement. For example, 39 percent of cardiologists and 41 percent of "other medical" specialists (e.g., allergists, nephrologists) chose to participate. Like the internists, general practitioners had participation rates of about 1-in-3, but family practice physicians averaged less than 1-in-4. This may reflect philosophical differences among the three groups, variations in Medicare dependence, or some other attribute of the practice.



TABLE 4-1

MEDICARE PARTICIPATION RATES BY SPECIALTY, OCTOBER 1984

<u>Specialty</u>	<u>Participation Rate</u>
All Specialties	33.7%
General Practice	31.3
Family Practice	23.9
Internal Medicine	33.0
Cardiology	38.8
Other Medical Specialties ^a	40.5
General Surgery	46.5
Orthopedic Surgery	34.1
Ophthalmology	29.3
Urology	32.1
Obstetrics-Gynecology	34.0
Other Surgical Specialties	25.7
Other Specialties ^b	50.4

^aExcludes pediatrics.

^bExcludes anesthesiology, pathology, psychiatry and radiology.

Source: Physicians' Practice Costs and Income Survey, 1984-85.



Finally, the highest overall participation rate was found among "other specialists," including emergency physicians and neurologists. One-in-two physicians in this group signed the Agreement.

The multivariate analysis in Section 5.0 will examine the significance of these interspecialty differences, controlling for the independent effects of physician credentials, Medicare dependence, usual fees, competitive effects, and so on.

4.2 Physician Credentials

Ongoing debate has focussed on the effect of the Medicare Physician Participation Agreement program, coupled with the fee freeze, in creating a two-tier system, by denying access to "higher quality" physicians based on ability to pay. Critics claim and theory predicts that physicians facing a lower private demand would be more likely to sign the Agreement to boost their Medicare caseload. Table 4-2 presents mixed evidence. Younger physicians, female physicians, and those not board certified might be expected to participate in higher proportions than their older, male, and board-certified colleagues, but this does not appear to have been the case. In general, the participation rates ranged from 30 to 36 percent regardless of physician credentials. Graduates of non-English speaking, non-Western European medical schools, however, were considerably more likely than physicians trained elsewhere to sign the Agreement. Fully half of these foreign medical graduates were participants, compared to one-third of other graduates.

4.3 Physician Location

Table 4-3 presents the participation rates by region and urban/rural location. Physicians in urban areas were slightly more likely to sign the Medicare Participation Agreement than their rural colleagues (35% vs. 29%). This may be surprising given historically higher assignment rates among rural physicians (Mitchell and Cromwell, 1981). Additionally, the elderly in rural areas tend to be poorer and to have more limited complementary insurance coverage. Instead, lower participation rates among rural physicians may have been a function of their greater philosophical opposition to the program (Rosenbach, Cromwell, and Hurdle, 1984).



TABLE 4-2

MEDICARE PARTICIPATION RATES BY PHYSICIAN CREDENTIALS, OCTOBER 1984

	<u>Participation Rate</u>
<u>Age</u>	
Under age 40	34.5%
Ages 40-60	34.5
Over age 60	30.0
<u>Sex</u>	
Male	33.5
Female	36.4
<u>Medical School Status</u>	
Graduates of non-English speaking, non-Western European Medical Schools	50.0
All Other Medical Graduates	30.9
<u>Board Certification Status</u>	
Board Certified	32.1
Not Board Certified	36.5

Source: Physicians' Practice Costs and Income Survey, 1984-85.



TABLE 4-3

MEDICARE PARTICIPATION RATES BY PHYSICIAN LOCATION, OCTOBER 1984

	<u>Participation Rate</u>
Urban (SMSA)	34.6%
Rural (Non-SMSA)	29.0
Northeast	41.6
South	28.7
North Central	31.5
West	34.7

Source: Physicians' Practice Costs and Income Survey, 1984-85.



Large regional differences are shown in Table 4-3. Physicians in the Northeast were by far the most likely to sign the Agreement (42%), consistent with their generally high assignment rates. Also, a relatively high proportion of Western physicians opted to sign the Agreement compared to physicians in the North Central and Southern regions. The regional participation rates are comparable to reports by physicians nearly a decade earlier on their likelihood of participating in Medicare under an "all or nothing" option (Mitchell and Cromwell, 1983). For example, 39 percent of Northeastern physicians and 32 percent of those in the West reported they would accept all cases on assignment versus 27 percent in the South and North Central regions.

4.4 Medicare Dependence

Physicians who are more dependent on Medicare patients (relative to their total caseload) are hypothesized to be more likely to sign the Participation Agreement. Physicians with trivial Medicare caseloads will lose less by having their allowable charges frozen under the fee freeze and can shift out of Medicare most easily. This is borne out in Table 4-4. As Medicare dependence increased, participation rates rose. Physicians with Medicare caseloads accounting for more than three-fifths of their patients had a participation rate of 43 percent. In contrast, where Medicare patients accounted for under a third of the total caseload, the participation rate was about 29 to 30 percent. On average, Medicare patients represented 35 percent of participants' caseloads versus 31 percent of nonparticipants' caseloads (data not shown).

4.5 Collection Rates and Physician Fees

Theory predicts that where collection rates are lower, physicians will be more likely to sign the Medicare Participation Agreement. Our survey instrument provides a direct measure of the collection ratio: each physician was asked what percentage of patient billings were collected by the practice during the previous year. Although the question refers to total billings, it is probably a reasonably good measure of Medicare billings as well. Physicians who chose to sign the Participation Agreement apparently did have



TABLE 4-4

MEDICARE PARTICIPATION RATES BY MEDICARE DEPENDENCE, OCTOBER 1984

<u>Medicare Dependence</u> (% of patients)	<u>Participation Rate</u>
1 to 10%	30.4%
11 to 20%	29.4
21 to 30%	29.8
31 to 40%	34.3
41 to 60%	39.2
61% or more	42.6

Source: Physicians' Practice Costs and Income Survey, 1984-85.

more difficulty collecting directly from patients, compared with non-participating physicians (Table 4-5). One-in-four participants collected less than 85 percent of patient billings, while only one-in-six nonparticipants had such low collection rates. Signing the agreement to accept all Medicare cases on assignment is one way of reducing uncollected bills.

Table 4-5 also shows the usual, Medicare, and Blue Shield fees for an intermediate office visit with an established patient. Fees have been adjusted for geographic cost of living differences. (A county-level cost of living indicator was imputed based on population size, population per square mile, per capita income, median monthly rent, and median value of single family home.) Participants charged higher fees for an office visit and were allowed somewhat higher charges by Blue Shield and Medicare, compared with nonparticipants. These fee differentials are small, however, and the fees have not been adjusted for specialty mix differences between the two groups. More important is the ratio of the Medicare reasonable charge to the usual fee, but here, too, the differences are minimal.



TABLE 4-5

COLLECTION RATES AND USUAL FEES, BY MEDICARE PARTICIPATION STATUS,
OCTOBER 1984

	<u>Participants</u>	<u>Non-participants</u>
<u>Collection Rate</u> (% of direct patient billings)		
95-100%		
90-94%	33.2%	38.4%
85-89%	28.5	31.6
Less than 85%	14.2	14.6
	24.1	15.4
<u>Fees for Office Visit*</u>		
Usual fee	\$29.93	\$28.54
Blue Shield allowed charge	25.87	24.77
Medicare reasonable charge	22.08	20.47

*Adjusted for geographic cost of living variations.

Source: Physicians' Practice Costs and Income Survey, 1984-85.



5.0 ECONOMETRIC ANALYSIS OF THE MEDICARE PARTICIPATION DECISION5.1 Empirical Specification

A structural equation of the participation decision can be written as follows:

$$\text{PPA} = f(\text{PCTMCR}; \text{MCRF}; \text{BSF}; \text{CRR}; \text{CC}; \text{ECON}; \text{MDCRED}; \text{MDCHAR}; \text{PRACC}; \text{COMP}; \text{INF}; \text{POLIT})$$

where PPA = 1 if the physician signed the agreement; zero otherwise

PCTMCR = Medicare dependence

MCRF = Medicare allowed charge

BSF = Blue Shield allowed charge

CRR = Carrier rate of reduction

CC = Collection costs

ECON = Vector of local market economic demand conditions

MDCRED = Vector of physician credentials

MDCHAR = Vector of physician characteristics

PRACC = Practice costs

COMP = Vector of local market competition

INF = Local area inflation rate

POLIT = Physician political attitudes.

Variable definitions and means are presented in Table 5-1. All monetary variables are adjusted for geographic cost-of-living differences.

Dependent Variable: The dependent variable is specified as a dichotomous variable (PPA) in which "one" signifies that the physician signed the participation agreement, and "zero" signifies that he/she did not sign.

Independent Variables - Medicare Dependence: The physician's Medicare dependence (PCTMCR) is the proportion of his or her total patient load that is insured by Medicare Part B. Greater Medicare dependence increases the probability that the physician will choose to sign the participation agreement. (Ideally, we would have used the physician's assignment rate as an endogenous recursive variable; unfortunately the survey did not ask participating physicians about their pre-agreement assignment rates.)



TABLE 5-1
VARIABLE MEANS AND DEFINITIONS

<u>Variable</u>	<u>Definition</u>	<u>Mean</u>
PPA	Whether the physician signed the Medicare participation agreement (PPA=1) or not (PPA=0)	0.34
PCTMCR	Medicare caseload (proportion of physician's patients who receive Medicare Part B)	0.33
MCRF	Medicare allowed charge for a follow-up office visit	19.18
BSF	Blue Shield fee for follow-up office visit	23.23
CRR	Carrier rate of reduction	0.24
PTCOLL	Collection ratio (proportion of direct patient billings)	0.89
DENY	Proportion of all claims that are denied	0.07
INVEST	Proportion of all claims that are investigated	0.04
Y	Per capita income (in thousands)	10.62
OVER65	Proportion of persons aged 65 and over (excluding Medicaid eligibles)	0.10
FP	Physician is family practitioner	0.16
IM	Physician is internist	0.17
CARD	Physician is cardiologist	0.04
OTHMED	Physician is other medical specialist	0.10
GS	Physician is general surgeon	0.10
OBGYN	Physician is OB-GYN	0.10
OPHTHAL	Physician is ophthalmologist	0.06
ORTHO	Physician is orthopedic surgeon	0.07
UROL	Physician is urologist	0.03



TABLE 5-1 (continued)

VARIABLE MEANS AND DEFINITIONS

<u>Variable</u>	<u>Definition</u>	<u>Mean</u>
OTHSURG	Physician is other surgical specialist	0.07
OTHSPEC	Physician is other specialist	0.04
GP	Physician is general practitioner (omitted category)	0.24
BOARD	Physician is board-certified	0.65
FMG	Foreign medical graduate (from a non-Western European Non-English-speaking country)	0.15
MDAGE	Physician's age	49.34
MDAGESQ	MDAGE squared	2567.72
FEMALE	Physician is female	0.04
NONMEDY	Physician (and spouse) has nonpractice income of \$10,000+	0.35
WAGE	Wage index for hospital personnel	1.07
MALPRAC	Average malpractice premiums (in thousands)	7.16
MDPOP	Physician-population ratio	2.08
HMO	HMO enrollees per population	0.08
CPI	Area inflation rate 1983-84	0.04
CENTRAL	Physician practices in North Central region	0.21
SOUTH	Physician practices in South region	0.33
WEST	Physician practices in West region	0.22
EAST	Physician practices in Northeast region (omitted category)	0.24

Source: Physicians' Practice Costs and Income Survey, 1984-85.



It is possible that some explanatory variables in our model, like specialty, will influence the participation decision indirectly through their impact on the size of the physician's Medicare caseload. In order to better assess the total impact of these variables, we will re-estimate the PPA equation, excluding PCTMCR.

Fee Schedules: Two variables are included to measure the influence of relative fee schedules: the Medicare allowed charge for a follow-up office visit (MCRF) and Blue Shield's maximum allowed payment for the same procedure (BSF). Both fees were constructed from physician self-reported survey data and are defined for the physician's Medicare reasonable charge locality and Blue Shield plan area, respectively. As these responses may reflect an area's specialty mix, individual physician responses were weighted by national proportions of physicians in each of the specialty groups. The participation decision is hypothesized to be positively related with the Medicare allowed charge and negatively with the Blue Shield fee schedule.

The size of the Medicare "discount" (the difference between the physician's submitted charge and what Medicare deems reasonable) is an additional measure of the relative generosity of Medicare carriers. In order to capture this, we also included the carrier rate of reduction (CRR), i.e., the percent of times the Medicare payment is less than the physician's charge. This variable, although defined for a fairly large area (carrier-wide), does provide a partial measure of the physician's net fee. The higher the carrier rate of reduction, the less likely the physician will choose to participate.

Collection Costs: Two kinds of collection costs are included: costs associated with collecting payment from the patient and from the Medicare carriers. Although we do not have a measure of the actual costs associated with collecting from patients, we do have a measure of the physician's collection ratio. Each physician was asked what percent of their direct patient billings went uncollected because of patient bad debts. We specified PTCOLL as one minus the proportion uncollected. Where collection rates are lower, thus reducing net fees, physicians are hypothesized to be more willing to sign the participation agreement.

Two measures of the administrative burden associated with Medicare assignment were available from Part B carriers for 1984: (1) claims investigation rates (INVEST) and (2) denial rates (DENY). Physicians are hypothesized to be more willing to participate when these costs are lower, ceteris paribus.

Ability to Pay: Two variables measure ability to pay: income and Medicare coverage. Income (Y) is defined as per capita income in the physician's county and is hypothesized to shift the fee-setting demand curve outwards, thus discouraging participation.

Medicare coverage is defined as the proportion of persons aged 65 years and over in the physician's county (OVER65), excluding joint Medicare-Medicaid eligibles where assignment is mandatory. Greater coverage raises demand for both assigned and nonassigned services, but the net effect on the probability of signing the agreement is clearly negative. In communities with a disproportionately larger elderly population, the downward sloping portion of the demand curve shifts outward, allowing the physician to draw upon a larger pool of nonassigned patients before entering the assignment market. The horizontal (assigned) portion of the curve also lengthens, putting off the point where patients are no longer willing to pay the full coinsurance.

Physician Credentials: Three variables measuring the physician's credentials will influence his (her) willingness to sign the participation agreement: specialty, board-certification, and FMG status. Specialists face a higher demand for their services in the fee-setting market, and are hypothesized to be less likely to participate than are general practitioners. Offsetting this demand effect is a collection effect, i.e., the apparent willingness of physicians with large bills to take assignment in order to guarantee payment. We know from previous work, however, that the latter effect dominates. Thus, surgeons are hypothesized to be more willing to participate than either medical specialists or GPs, ceteris paribus.

Board-certified physicians and U.S. medical school graduates are generally considered to be of higher technical quality, and hence face a greater private demand for their services. As a result, they are hypothesized to be less likely to sign the participation agreement. BOARD and FMG each assume the value one if the physician is board-certified, or if he/she is an FMG from a non-English speaking, non-Western European country.



Physician Age: More experienced physicians may be less willing to sign agreements, because of their higher implicit wage. As physicians age, however, demand for their services may fall in the private market. In this instance, participation rates will be higher. Because we expect the relationship to be U-shaped, physician age will be specified both in linear and squared form. If the wage effect dominates through late middle age with the demand effect becoming more important in later years, we would expect the MDAGE and MDAGESQ variables to be positive and negative, respectively.

Practice Costs: Practice costs include the cost of the physician's time, the wage rate for nonphysician personnel, and malpractice premiums. Physicians with nonpractice income (including spouse income) over \$10,000 (NONMEDY) and women physicians (FEMALE) are hypothesized to value their leisure time more highly, and thus be less willing to participate.

When wage levels and malpractice costs are high, physicians will be less willing to sign the participation agreement. The WAGE variable is defined as the PPS wage index for hospital personnel. (Since physician practices and hospitals presumably draw upon the same labor pool, this would seem to be a reasonable proxy for physician office personnel wages.) MALPRAC is defined as the total malpractice amount paid by each physician (based on survey self-reported premium data).

Competition: Two variables measure local market competition for physicians' services: physician supply and HMO penetration. MDPOP is defined as the number of patient care physicians per 1,000 county population. As this ratio rises, competition among physicians for private patients increases and private demand shifts in, encouraging participation. MDPOP is thus hypothesized to be positively related to the probability of participation. A negative (or zero) coefficient, on the other hand, could be interpreted as evidence that physicians can protect their workloads by inducing demand for nonassigned services.

Areas with greater HMO activity are predicted to encourage participation by imposing constraints on shifting to privately insured patients. HMO is defined as the proportion of county population enrolled in HMOs. Data on HMO enrollments in 1984 were obtained from the annual Census of Health Maintenance Organizations conducted by InterStudy.

Inflation: The carrot of updated fees for participating physicians is hypothesized to be more attractive in areas with higher rates of cost inflation. CPI is defined as the 1983-1984 inflation rate in the all services Consumer Price Index.

Political Attitudes: Finally, it would be desirable to have independent measures of physician attitudes toward government, but they were not available on the survey. Instead, we use regional dummies to capture unmeasured attitudinal factors not reflected in other demand and supply variables. CENTRAL, SOUTH, and WEST each assume the value one if the physician practices in the North Central, Southern, or Western census regions, respectively. The Northeast region constitutes the omitted category.

5.2 Estimation Methods

With a qualitative, zero-one, dependent variable (nonparticipating = 0, participating = 1), ordinary least squares (OLS) is inefficient because of the concentration of values at the two extremes. Multivariate probit analysis is preferred because it constrains the predicted values of the dependent variable to the unit (0, 1) interval (Goldberger, 1964). In the probit model, the conditional expectation is given by

$$E(y_i / \hat{I}_i) = \text{Prob } (y_i = 1 / \hat{I}_i) = F(\hat{I}_i),$$

where y_i = zero or one, depending on whether the physician signs the agreement

\hat{I}_i = predicted value of index ($\sum \beta_i X_i$)

$F(\cdot)$ = cumulative normal distribution

The conditional probability of the physician choosing to participate (that is $y_i = 1$) can be determined by looking up values of \hat{I}_i in a cumulative normal distribution table.

5.3 Econometric Results

Two regression equations are shown in Table 5-2. OLS regression results (eq. 1) are included for comparative purposes with the probit equation (eq. 2). Where there are differences, greater reliance should be placed on

TABLE 5-2

REGRESSION RESULTS FOR MEDICARE PARTICIPATION ANALYSIS

<u>Independent Variables</u>	<u>Probability of Signing Agreement</u>	
	<u>OLS</u>	<u>Probit</u>
PCTMCR	0.215***	0.617***
MCRF	0.015***	0.045***
BSF	-0.002	-0.007
CRR	0.005	-0.004
PTCOLL	-0.193*	-0.562**
DENY	-1.468*	-4.329*
INVEST	-1.317**	-3.797**
Y	-0.017**	-0.051***
OVER65	-0.478	-1.431
FP	-0.057	-0.200
IM	-0.045	-0.139
CARD	0.020	-0.057
OTHMED	0.071	0.187
GS	0.147***	0.408***
OBGYN	0.097*	0.279*
OPHTHAL	-0.040	-0.124
ORTHO	0.072	0.207
UROL	0.005	0.013
OTHSURG	-0.023	-0.080
OTHSPEC	0.174***	0.473***
BOARD	-0.032	-0.099
FMG	0.154***	0.424***
MDAGE	0.001	0.003
MDAGESQ	-0.000	-0.000
FEMALE	-0.022	-0.051
NONMEDY	0.011	0.032
WAGE	0.012	0.077



TABLE 5-2 (continued)

REGRESSION RESULTS FOR MEDICARE PARTICIPATION ANALYSIS

<u>Independent Variables</u>	<u>Probability of Signing Agreement</u>	
	<u>OLS</u>	<u>Probit</u>
MALPRAC	-0.003*	-0.095*
MDPOP	-0.009	-0.029
HMO	0.594***	1.705***
CPI	3.922	11.841
CENTRAL	-0.013	-0.021
SOUTH	-0.081**	-0.231**
WEST	-0.010**	-0.282**
CONSTANT	0.419	-0.203

$$R^2(c) = 0.075$$

$$F(34, 2184) = 6.2***$$

$$\text{chi-square} = 207***$$

***Significant at the one percent level.

**Significant at the five percent level.

*Significant at the ten percent level.

Source: Physicians' Practice Costs and Income Survey, 1984-85.



the probit results. A third equation, excluding the PCTMCR variable, was also estimated using ordinary least squares. It had been hypothesized that the impact of certain variables on the participation decision might be captured through their indirect impact on Medicare dependence. In fact, the results from this third regression were virtually identical to those found when PCTMCR was included, and hence are not shown here.* Of course, only physicians who treated at least some Medicare patients (and hence were asked the participation question) were included in our analyses, thus attenuating this potential indirect effect.

Because the probit coefficients are not directly interpretable, a table of marginal impacts for selected, statistically significant variables is provided (Table 5-3). Elasticities are calculated for continuous variables and marginal effects for discrete, dummy variables. For example, a 1 percent increase in the Medicare claims denial rate (DENY) resulted in a 0.32 percent decline in the average participation rate. Marginal effects simply give the absolute change in the probability of participation associated with positive values of the discrete independent variables. Thus, being a general surgeon increased the probability of participating by 15.5 percentage points, ceteris paribus, relative to GPs (around a mean of 34 percent).

As expected, Medicare dependence had a strong impact on the participation decision. Physicians who had larger Medicare caseloads to start with were significantly more likely to sign participation agreements. The estimated elasticity associated with the PCTMCR variable is 0.22, however, suggesting that the physician's decision was only moderately responsive to his current Medicare activity. Physicians with one-half of their caseload devoted to Medicare patients were about 30 percent more likely to sign than were physicians who only depend on Medicare for one-tenth of their patients.

The impact of an increase in the Medicare reasonable charge is clearly positive, as predicted, and highly significant. Physicians were definitely more willing to sign participation agreements when reasonable charges were higher. The estimated elasticity associated with the MCRF variable is almost

*There was one exception; the dummy OBGYN variable turned insignificant when PCTMCR was excluded. This is not surprising given the very small Medicare caseloads of OB-GYNs.

TABLE 5-3

IMPACT OF SELECTED EXPLANATORY VARIABLES ON THE MEDICARE PARTICIPATION DECISION

	<u>Elasticity^a</u>	<u>Marginal Effect</u>
PCTMCR	0.22	--
MCRF	0.97	--
PTCOLL	-0.55	--
DENY	-0.32	--
INVEST	-0.18	--
Y	-0.60	--
GS	--	15.5
OBGYN	--	10.5
OTHSPEC	--	18.2
FMG	--	16.0
MALPRAC	-0.07	--
HMO	0.15	--
SOUTH	--	-8.2
WEST	--	-9.7

^aUnlike OLS estimates, probit elasticities will vary somewhat depending on whether one assumes an increase or decrease in the independent variable. Here we assumed a 10 percent increase in all continuous variables in calculating the elasticities.

Source: Physicians' Practice Costs and Income Survey, 1984-85.



one, suggesting that the magnitude of physician response to changes in the reimbursement level would be quite large. A 10 percent increase in the Medicare reasonable charge increased average participation rates by 9.7 percent, or 3.3 percentage points (around a mean of 34%). Relative reimbursement levels for other third-party payers do not appear to have influenced the participation decision; the BSF variable was insignificant.

While the size of Medicare's discount, as measured by the carrier rate of reduction (CRR),^{*} had no discernible effect on physicians' willingness to sign agreements, higher collection costs definitely discouraged participation. Medicare carriers with higher claims denial rates (DENY) and investigation rates (INVEST) paid a price for their vigilance in terms of reduced participation levels. As expected, high collection ratios (implying low patient collection costs) reduced the physician's willingness to sign. A 10 percent increase in a physician's collection ratio (PTCOLL) lowered the probability of his (her) participation by 5.5 percent.

Areas with higher incomes raised private demand (including nonassigned Medicare demand), thus significantly depressing participation levels. The probability of physicians choosing to participate in areas with per capita incomes one standard deviation below the mean ($Y=8.57$) was 26 percent greater than in areas where average incomes were one standard deviation above the mean (12.74). The second community demand variable measuring Medicare coverage (OVER65) was not significant.

It had been hypothesized that surgeons' desire to ensure collection of large bills would dominate the higher private demand for their services (relative to GPs) and lead to greater participation. For two of the surgical specialties, this was certainly the case. The marginal effects for the GS and OB-GYN coefficients (shown in Table 5-3) imply that the participation rate for general surgeons was about 50 percent higher and OB-GYNs 33 percent higher than that for GPs, ceteris paribus. The remaining surgical specialists (ophthalmologists, orthopedic surgeons, urologists, and other surgical specialties) were neither more nor less likely than GPs to sign participation agreements. Despite presumed higher demand for their services, medical specialists (internists, cardiologists, etc.) were not any less willing to

* As an alternate measure of the Medicare discount, we ran the regression with "the percent of claims paid in full." Like the carrier rate of reduction, this variable was not significantly associated with the probability of signing the agreement.

participate, compared with general practitioners. Finally, the "all other" specialty group was significantly more likely to sign up. This is a heterogeneous group of physicians that includes specialties as diverse as neurology, physical medicine, and emergency medicine.

There is no evidence that board-certified physicians were any less likely to sign participation agreements. In separate specialty-specific regressions (not shown), board-certified family practitioners, other medical specialists, OB-GYNs, and "all other" specialists were less likely to participate, but the estimates were significant only at the 10 percent confidence level. No differences in participation status between board- and non board-certified physicians were demonstrated for the remaining specialty groups (GPs, internists, cardiologists, general surgeons, ophthalmologists, orthopedic surgeons, urologists, and other surgical specialists).

Graduates from non-English speaking, non-Western European medical schools (FMG) were significantly more likely to participate. All other things equal, the probability that these foreign medical graduates would agree to participate is 46 percent, compared with only 30 percent for the average graduate from a U.S. or Western European medical school.

In contrast with theory and with previous empirical work, there were no differences in willingness to participate based on physician age. Other time price variables (FEMALE and NONMEDY) were also insignificant.

Wage levels for nonphysician personnel (WAGE) had no effect on participation levels, but the final practice cost variable, malpractice premiums, was significant at the 10 percent level. Physicians with high malpractice costs (MALPRAC) were less willing to participate and accept Medicare's reasonable charge as payment in full. The estimated magnitude of this effect is relatively small, however; a 10 percent increase in malpractice premiums lowered the probability of participation by only 0.7 percent.

Increased competition, as measured by more physicians per capita (MDPOP), had no impact on the participation decision, suggesting that physicians were able to protect their nonassigned workloads through inducement. Shifting to privately insured patients was limited in areas with greater HMO activity, thereby encouraging physicians to sign participation agreements. The HMO variable is positive and highly significant, although its associated elasticity is fairly low; a 10 percent increase in relative HMO

enrollments raised the probability of participation by 1.5 percent. This small elasticity is largely due to low HMO penetration rates (only 7.7 percent of the population was enrolled in HMOs in 1984). As HMO enrollments continue to increase, however, physicians should be even more willing to sign agreements. The coefficient associated with our HMO variable suggests that in areas with twice the average HMO activity ($HMO=0.154$), physicians were 34 percent more likely to participate than in areas with no HMO enrollment.

It had been hypothesized that in areas which had experienced relatively higher cost inflation, physicians would be more likely to participate in return for post-freeze updated fees. The CPI variable was insignificant, however, suggesting that this "carrot" was ineffective (or its promise was not given much credence by physicians). Alternative explanations include (1) the fact that general inflation had slowed to such an extent (only 4% from 1983 to 1984) that the perceived value of the fee update was diminished, and/or (2) our CPI measure lacked sufficient cross-sectional variation to capture an inflation effect (its coefficient of variation was only 0.11).

Finally, we included regional dummy variables to capture attitudinal differences or other unmeasured factors. Physicians practicing in the South and West were significantly less likely to participate than were their colleagues in the North Central (the CENTRAL dummy was insignificant) and in the Northeast (the omitted category) regions. The marginal effects associated with SOUTH and WEST imply substantial inter-regional differences in willingness to participate; Southern physicians were 23 percent less likely to sign and Western physicians 28 percent less likely, compared with physicians elsewhere. We know from HCFA statistics that assignment rates show similar geographic differences, and inclusion of an assignment variable might well diminish the coefficients for these regional dummies. However, these large differences in assignment rates are themselves thought to reflect (in part) political and attitudinal factors.

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